

MTB-1501S INCREMENTAL MAGNETIC  
TAPE TRANSPORT AND SYSTEM

## FEATURES

- Asynchronous Read/Write and Write Only Models
- IBM-Compatible 200 bpi Tape Format . . . Automatic I-R Block Generation
- Single-Capstan Tape Drive
- Completely Asynchronous Operation — Over 300 Characters/Second with Less Than  $\pm 10\%$  Pulse Spacing Jitter
- High-Speed Continuous Mode for Rapid Read Check Recycling and Interblock Gap Generation
- All Solid-State Electronics
- Vacuum Column Slack Loop with Photo-electric Loop Sensing
- Recording Accuracy Better than 1 in  $10^6$
- Maximum Interchangeability of Parts — Member of MT-24/36/75 Family of Tape Transports.

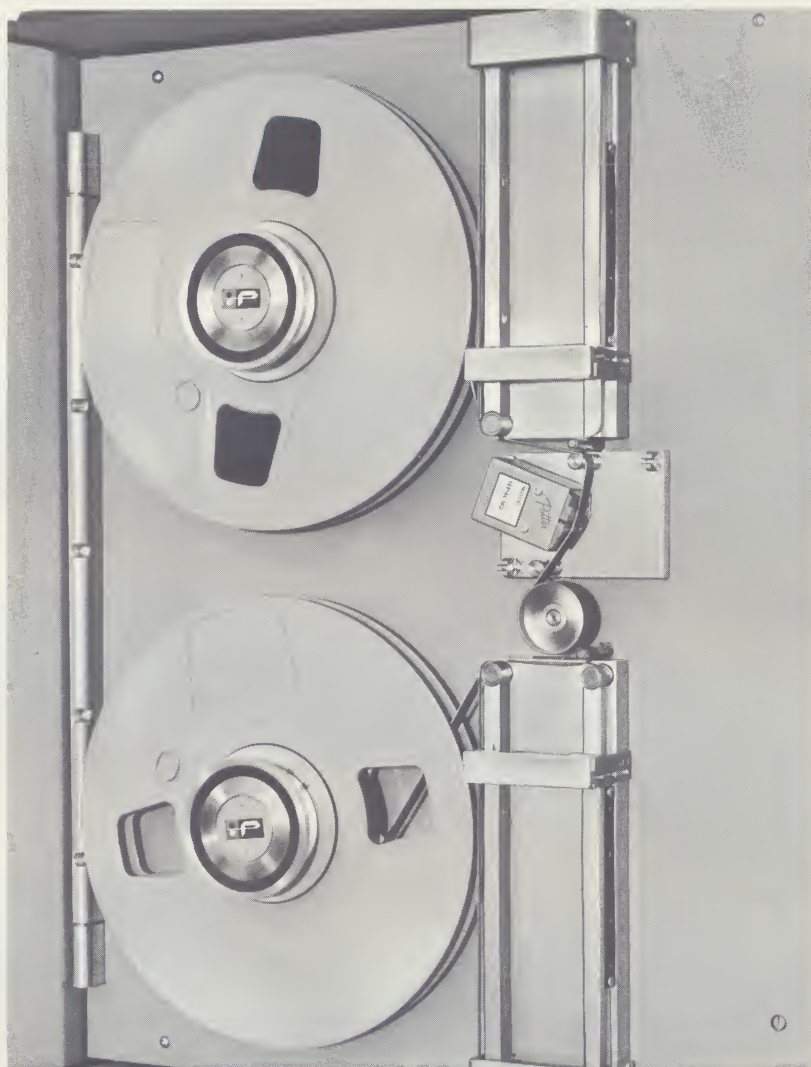


Figure 1. Model MTB-1501SRW Magnetic Tape Transport for Reading and Writing Incrementally

## GENERAL

Magnetic Incremental Stepping Recorders are finding widespread use in the fields of data logging, digital data transmission and data processing. These units record digital data on magnetic tape one character at a time with constant spacing. Unlike computer tape transports which require a constant data rate and a fixed tape speed to insure computer-capability bit density, incremental stepping transports record asynchronously to maintain constant packing density.

Tape is advanced on receipt of a digital character and records information received at any fixed or variable rate from 1 to 300 characters per second.

The incremental magnetic tape transport eliminates the need for intermediate storage (i.e.: punched paper tape and tape-to-tape conversion operations). Typical applications include off-line data logging, digital data transmission and data processing, inventory control, telemetry, point-of-origin data documentation and long-term recording.

## DESCRIPTION

The Potter MTB-1501S Magnetic Incremental Tape Transport provides *either* writing and reading or writing only capability in a 300 character-per-second incremental feed mode using an IBM 200 bpi tape format. Both units are designed on a standard Potter Model MT-24 transport panel frame to achieve maximum interchangeability of common spare parts, simplicity of maintenance procedures, and flexibility of operation with Potter's MT-24/36/75 family of low-cost tape transports.

The two models are designated: MTB-1501SRW for the Read/Write system and MTB-1501SW for Write only installations. The MTB-1501SRW utilizes a new, proprietary drive mechanism which permits asynchronous step reading as well as writing up to 300 characters - per - second. The Write only MTB-1501SW employs a conventional magnetically positioned drive motor and also provides 300 character-per-second recording. Bit positioning accuracy (pulse spacing jitter) on both models is less than  $\pm 10\%$ .

In addition to the incrementing mode, a continuous drive mode providing 36 ips steady running speed and fast Start/Stop times permits interblock gaps to

be generated with a minimum of lost time. The continuous mode may also be used for high-speed back-spacing to permit check reading and rewrite of blocks of information.

The MTB-1501S employs a single-capstan tape drive for accurate tape motion control, vacuum-column slack loops with photoelectric loop sensing, and handles standard 10 $\frac{1}{2}$ -inch reels of  $\frac{1}{2}$ -inch tape. Solid-state circuits are included for controlling all operations by means of standard logic signals.

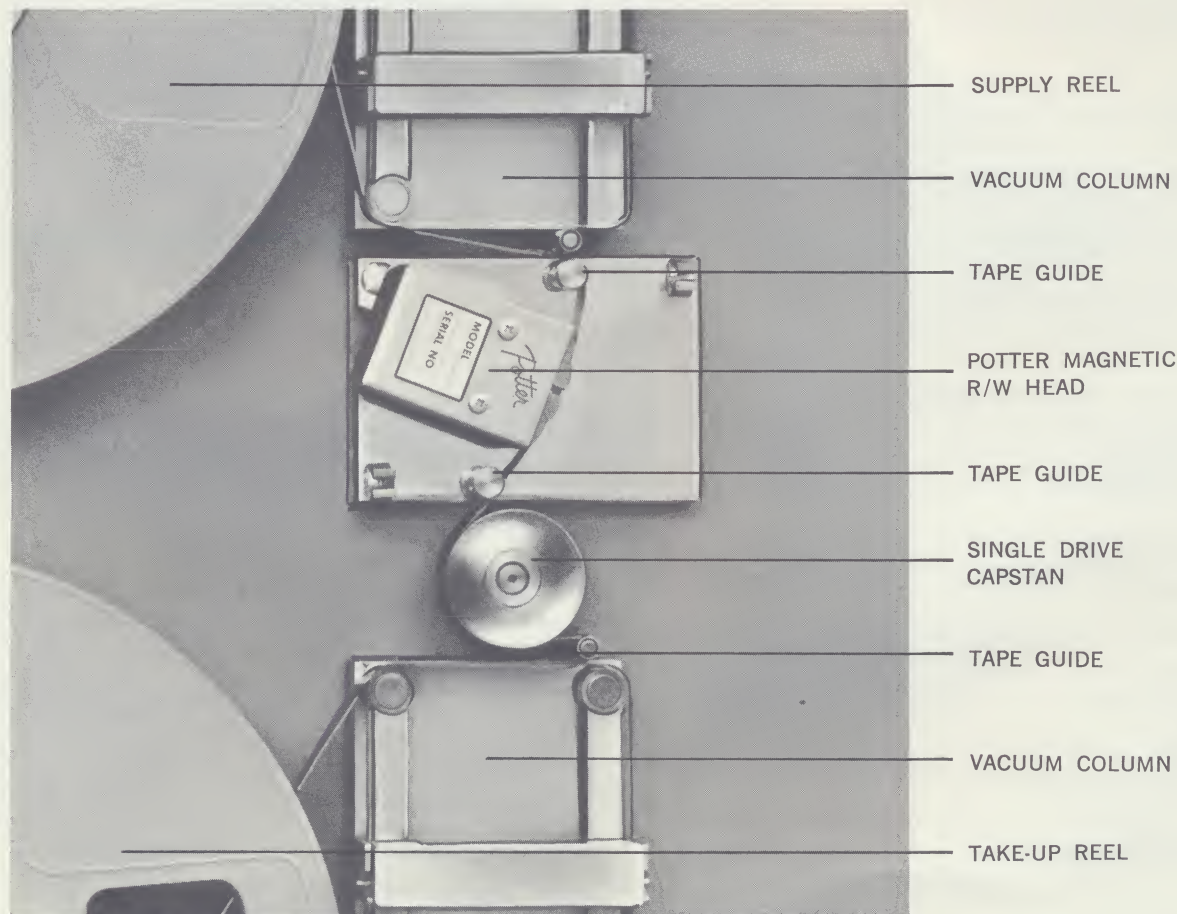
The entire transport, including control panels and drive electronics, fits on a standard 19-inch rack. The transport panel requires only 24 $\frac{1}{2}$  inches (minimum) of vertical space and 12 inches in depth. All controls are on the front, and printed circuit cards are inserted and removed from the front.

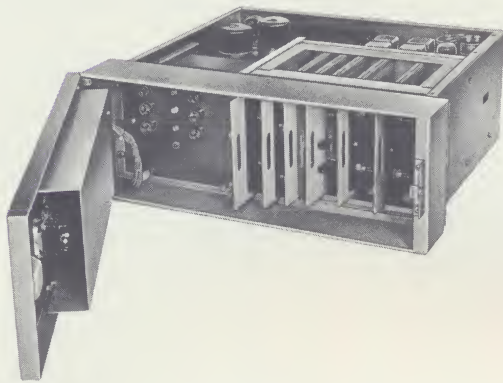
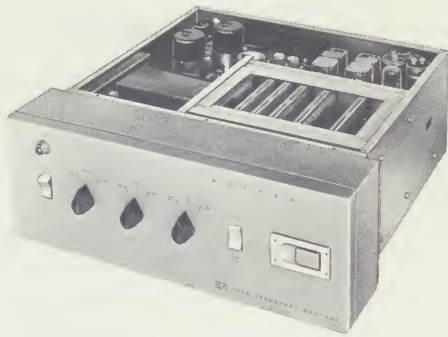
A special version of the Potter MA315 solid-state Read/Write Amplifier is available for incremental and 36 ips Read/Write operation in IBM tape formats. (See Specifications)

Accessory items include a Potter M6400 series 7-channel IBM 729 compatible single-gap Read/Write head assembly, manual control pushbutton station, a tempored glass dust cover, and Potter AC-8501 QUICK-LOCK\* Hubs for instant reel changing.

\*Patent applied for. QUICK-LOCK is a trademark of Potter Instrument Company, Inc.

Figure 2. MTB-1501S Incremental Tape Transport





### DRIVE ELECTRONICS & CONTROL PANEL

All MTB-1501S transport functions are controlled by a combined drive electronics and manual control assembly supplied with the transport. This compact package contains all electronics, together with necessary power supplies for automatic or manual operation. Electronics are solid-state and feature printed circuit plug-in modules. A hinged front door gives immediate access to plug-in modules.

For remote operation, the LOAD/MANUAL/AUTOMATIC switch is placed in the AUTOMATIC position; other controls in the STOP position.

### OPERATING CONTROLS

Three Rotary Position Switches  
 REVERSE/STOP/FORWARD  
 FAST REVERSE/STOP/FAST FORWARD  
 LOAD/MANUAL/AUTOMATIC

One Rockette Switch ..... ON/OFF

One Momentary Switch .... UNLOAD/LOAD POINT

Interlock switches protect equipment from operation error by prohibiting rapid switching from FAST FORWARD to FAST REVERSE.

The Potter vacuum-column tape handler incorporates a simple technique for loading and threading tape. Complete reel loading and tape threading can be accomplished in only fifteen seconds.

## ACCESSORIES

### M6400 MAGNETIC READ/WRITE HEAD

A complete selection of Potter magnetic heads is available for IBM 7-channel and other formats. Heads are all-metal and precision machined to stringent specifications for maximum tape life and minimum interchannel time displacement.

Characteristics of the Potter M6400 Series 7-channel IBM 729 Compatible, single-gap, Read/Write head assembly are:

No. of Channels .....	7
Track Width .....	0.032" $\pm$ .0015"
Track Spacing .....	0.070" $\pm$ .0015"
Write Gap .....	0.005 $\pm$ 10%-25%
Perpendicularity .....	$\pm$ 1 minute of arc
Write Winding .....	55 turns
Read Winding .....	400 turns
Write Current .....	60 milliamperes
Mounting .....	Special

### REELS AND HUBS

IBM-type reels and hubs are standard equipment on MTB-1501S transports. Reel/hub combinations of other manufacturers can also be accommodated. Special Potter QUICK-LOCK\* hubs are available for fast reel changing.

### EOT/BOT SENSING

Photoreflective (IBM-type) end-of-tape and beginning-of-tape sensing is available for reliable MTB-1501S tape control.

### WRITE CONTROL

A Write Lock-Out (Write Enable) switch is available for use with File Protect rings on IBM or NARTB reels.

### READ/WRITE ELECTRONICS

Each Read/Write electronics assembly may contain:

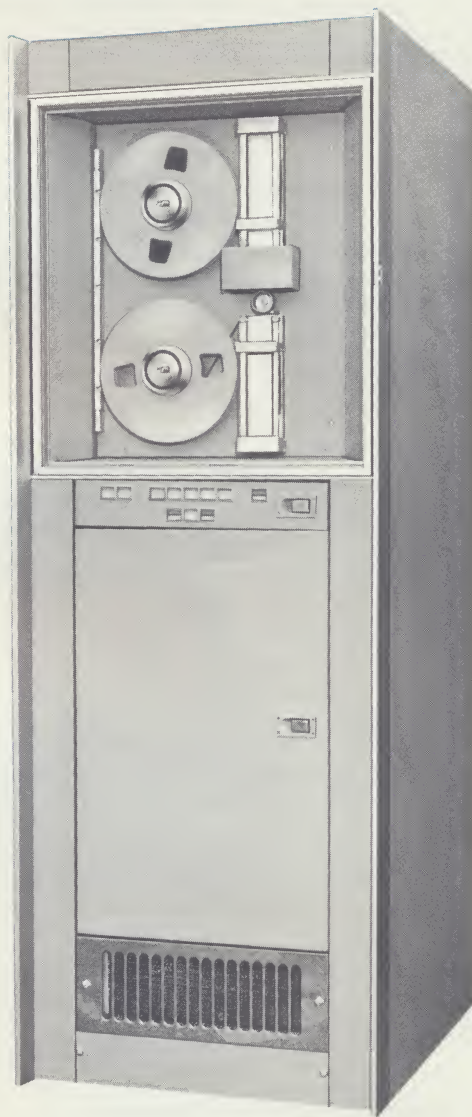
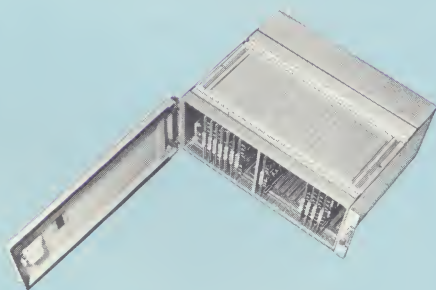
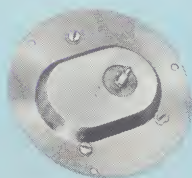
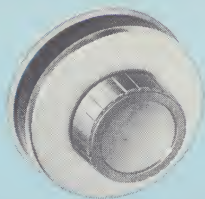
- Up to 8 Read/Write amplifier channels
- Clock Generator
- Write Inhibit electrical switching
- Erase Head control (as required)
- Power Supply

For further information see the following Product Data sheets:

- No. 1-401 M921A Read/Write Amplifier
- No. 1-402 MA315 Read/Write Amplifier
- No. 1-403 MSA375 Read/Write Switching Amplifier

### SWITCHING ELECTRONICS

Switching amplifiers are available which reduce the cost of digital magnetic tape systems by permitting time-sharing of a single Read/Write amplifier package among groups of up to four tape units.



#### CABINET

Potter's standard M3340 rack cabinet accommodates the MTB-1501S Tape Transport and accessories, providing for a complete, self-contained tape system. The sturdy construction of this cabinet permits full swing-out of the MTB-1501S transport. Standard 19-inch mounting rails give solid mounting support for drive electronics and Read/Write amplifier electronics assemblies.

## SPECIFICATIONS

TAPE FORMAT .....	IBM 7-channel, 200 bits/inch
TAPE FEED MODES .....	a) Incremental, Bidirectional b) Continuous, Bidirectional c) Rewind, Reverse Only
INCREMENTAL FEED .....	0 to 300 characters per second, FWD or REV, one character at a time on demand
INTERNAL INCREMENTAL FEED CONTROL, RECORDING .....	From tone-wheel derived position signal
INTERNAL INCREMENTAL FEED CONTROL, READING .....	From character gate signal (generated clock) developed in playback amplifier
CONTINUOUS FEED .....	36 ips, $\pm 10\%$ , FWD or REV, capstan driven
REWIND TIME (2400 FEET) .....	4 minutes
REVERSAL TIME .....	400 milliseconds
START/STOP DISTANCE	
INCREMENTAL FEED .....	0.005" $\pm 10\%$
CONTINUOUS FEED .....	Suitable for $\frac{3}{4}$ " interblock gap using 0.3 spacing dual Read/Write IBM-compatible head
END-OF-TAPE .....	IBM-compatible reflective spot detector for both Beginning End and Physical End
TAPE WIDTH .....	$\frac{1}{2}$ "
TAPE REEL .....	IBM 10 $\frac{1}{2}$ " or 8" plastic reels
PROGRAM LIMITATIONS .....	a) None in incremental mode b) None in continuous mode
POWER SOURCE .....	115VAC $\pm 10\%$ , 60 cps, single-phase
CONTROL SIGNALS .....	All functions arranged for remote control by computer logic signals, including:
	INCREMENT                      RUN
	FWD                              REWIND
	REV
RETURN SIGNALS	
READY .....	Indicates power on, tape threaded
END-OF-TAPE .....	Computer logic signal (e.g.: -6V logic "1", or logic "0") to indicate presence of reflective spot at sensor
PANEL DIMENSIONS, TAPE TRANSPORT .....	24 $\frac{1}{2}$ " high, 19" wide (rack mounting), 11" deep (same as Potter MT-24 Tape Transport)
DRIVE ELECTRONICS .....	7" high, 19" wide (rack mounting), 19" deep
NET WEIGHT	
MODEL MTB-1501SW	
TAPE TRANSPORT .....	85 lbs.
MODEL MTB-1501SRW	
TAPE TRANSPORT .....	95 lbs.
DRIVE ELECTRONICS .....	55 lbs.

MA 315 SERIES DUAL MODE READ/WRITE AMPLIFIER SYSTEM							
INPUT LINES				OUTPUT LINES			
Function	Description	No. of Lines	Signal	Function	Description	No. of Lines	Signal
Write	Write Data Input Lines	7	Pulse, 1 usec 1 = 0V @ 1.5 ma 0 = -3.5V to -15V	Read	Read Data Output Lines	7	Pulse, 0.5-2.0 usec: 1 = 0V 0 = -10V
Control	Write Enable	1	Level: 1 = 0V @ 1.5 ma 0 = -3.5V to -15V		Clock Output	1	Pulse, 0.5-2.0 usec: 1 = 0V 0 = -10V
	Erase Enable	1	Level: 1 = 0V @ 1.5 ma 0 = -3.5V to -15V	Control	Parity Error (IBM compatible systems only) (even)	1	Pulse, 0.5-2.0 usec 1 = 0V 0 = -10V
	Write Reset	1	Pulse, 1 usec: 1 = 0V @ 1.5 ma 0 = -3.5V to -15V				
	Low Threshold Select	1	Level: 1 = 0V @ 1.5 ma 0 = -3.5V to -15V		(odd)		1 = 0V 0 = -10V
	Read Inhibit	1	Level: 1 = 0V @ 1.5 ma 0 = -3.5V to -15V		EOB Indication	1	Pulse, 1.0 millisecc 1 = 0V 0 = -10V
	Read Reset	1	Pulse, 1 usec: 1 = 0V @ 1.5 ma 0 = -3.5V to -15V				
	EOB Inhibit	1	Level: 1 = 0V @ 7.5 ma 0 = -7.5V to -15V				
	Read Speed Select	1	Level: Step Speed = 0V 36 ips = -10V				

### POTTER WORLDWIDE FIELD SERVICE AND LOGISTICS PROGRAM

Repair centers in strategic locations within the continental United States and abroad have been established to support the entire Potter product line. Staffed by highly-trained field representatives, these repair centers are equipped to effect on-site installation of equipments and to perform quality repair, maintenance and overhaul.

Supplementing this capability, if a customer prefers to provide his own equipment support, Potter has established standard instruction courses to train customer personnel, either at Potter or in the field.

A Spare Parts Department, backed up by an ex-

tremely large inventory and streamlined order processing, is available for customer convenience and economy. This inventory permits the customer to realize virtual elimination of downtime as well as savings on spare parts dollars by offering expeditious delivery for replaceable parts. Delivery is available in 24 hours to meet customer emergency requirements — within 72 hours for standard parts under normal conditions. Potter also offers provisioning and logistics capabilities to meet all existing military specifications.

The Potter field service and logistics program is one of the finest in the EDP equipment industry. With reliable, quality-engineered equipment, supported by comprehensive field service, Potter guarantees satisfaction.



POTTER INSTRUMENT COMPANY, INC.

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## MT-36 MAGNETIC TAPE TRANSPORT AND MAGNETIC TAPE SYSTEMS



### INTRODUCTION

The new Potter MT-36 Magnetic Tape Transport is a low-cost unit designed for applications requiring moderate data transfer rates. It is particularly well-suited for use with small and medium scale computers, in mass storage and sequential access applications for which high-priced, high-performance transports cannot be justified. The MT-36 provides many features normally found only in more expensive transports. New over-and-under vacuum column tape storage is used in combination with Potter's precision tape drive system. Vacuum cleaning and vacuum tape drag before the read-write head assure high operating reliability.

MT-36 tape systems, which consist of an MT-36 tape transport, manual control unit, and suitable read-write electronics, are capable of reading tapes prepared on the IBM 7330. Conversely, tapes written on the MT-36 can be read on a 7330. Packing densities of 200, 556, and 800 bpi can be accommodated. Other conventional tape formats utilizing  $\frac{1}{2}$  or 1 inch tape are also available.

A read-write speed of 36 ips is standard with the MT-36, with fast two and one-half minute rewind. Start-stop profiles are smooth and *program restriction free over a command frequency rate up to 200 per second*. Other MT-36 design innovations provide simplified tape threading, convenient transport adjustments, and easier maintenance.

### FEATURES

- highest performance and reliability for lowest price
- up to 40 kc data transfer (800 bpi)
- compatible with 7330 and all IBM packing densities
- low inter-channel time displacement
- fast, smooth start-stop performance
- new vacuum cleaning incorporated in trough guides
- new over-and-under vacuum storage system
- vacuum muffled for silent operation
- fast two and one-half minute rewind
- tape loading in 15 seconds
- rapid, consistent tape stops with new vacuum tape drag

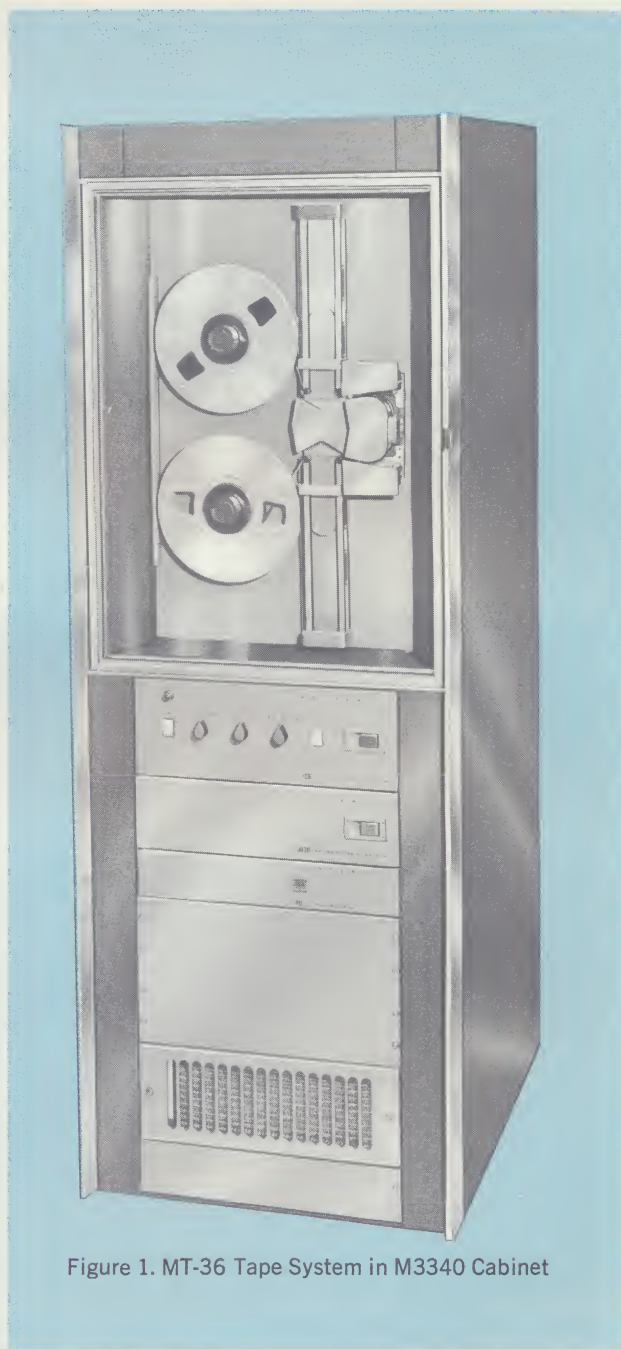


Figure 1. MT-36 Tape System in M3340 Cabinet

EFFECTIVE: APRIL 15, 1964

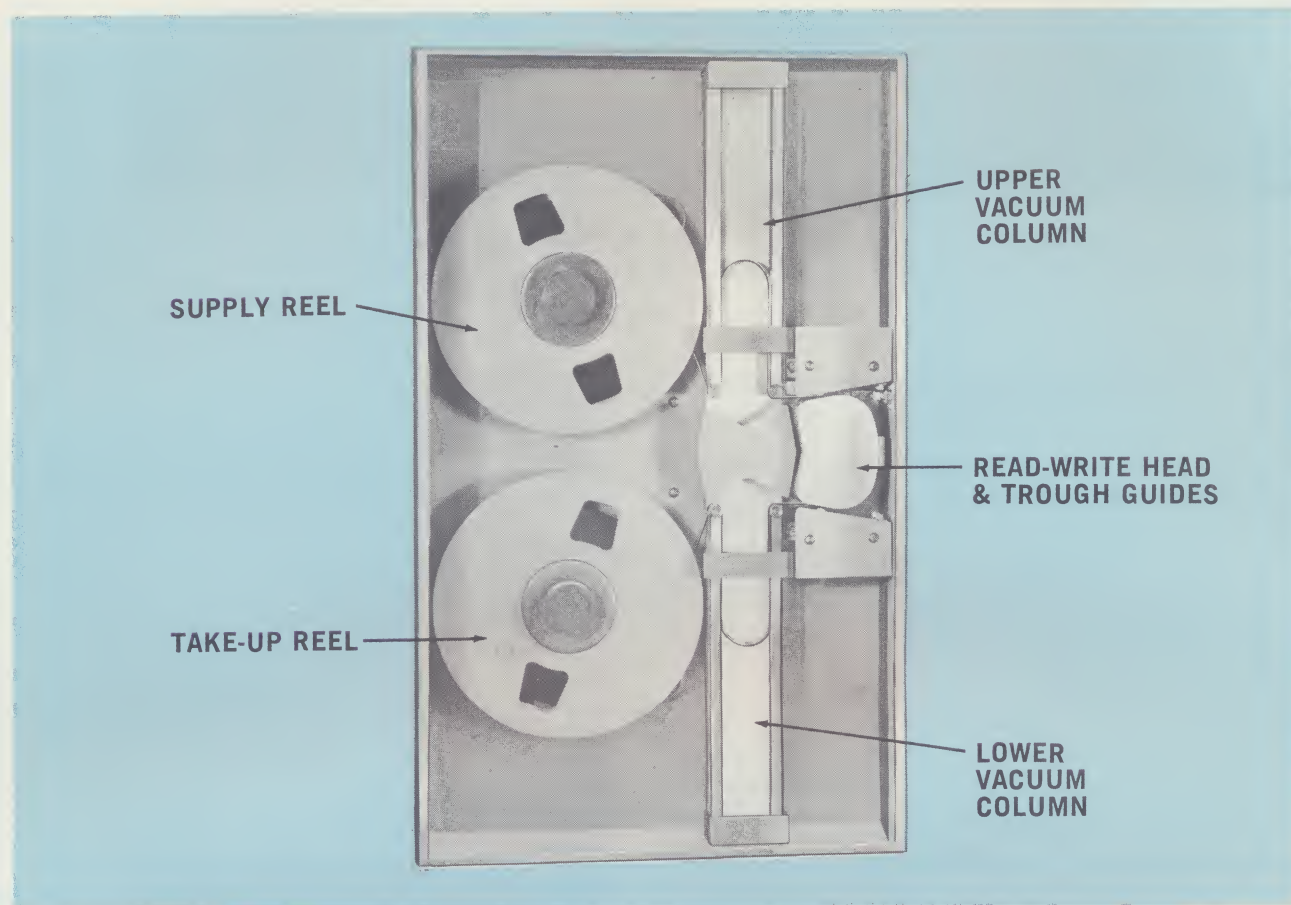


Figure 2. MT-36 Tape Drive

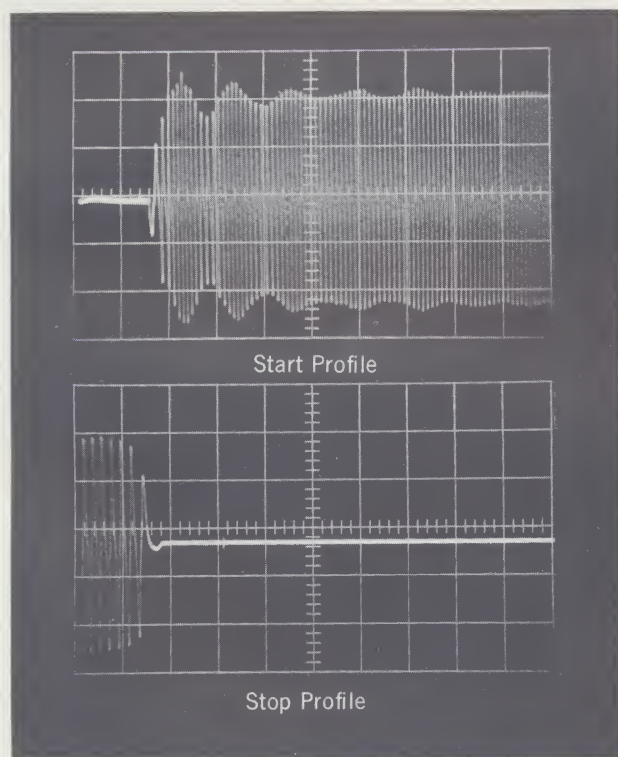


Figure 3. MT-36 Typical Velocity Profiles (1 div. = 1 ms)

### VACUUM COLUMN STORAGE

An extremely simple dual vacuum column tape storage system is incorporated in the MT-36 design—a feature normally associated with the most costly tape transport systems. Ample tape storage in the vacuum reservoirs provides restriction-free reading and writing up to 36 ips. Photoelectric loop sensing reliably controls amount of tape in both vacuum columns. Transparent vacuum column covers are readily detachable for easy access to column area during routine cleaning. The vacuum blower is soundproofed for exceptionally quiet operation.

### TAPE DRIVE SYSTEM

The MT-36 utilizes the Potter fast-response drive system which has become a standard of dependability in the EDP field. Tape motion is controlled by two drive capstans with associated solenoid-actuated drive rollers. New vacuum hold-down of tape in the trough guide area provides improved tape control. The slotted, vacuum tape guidance, which are precision-shaped for optimum tape guidance, hold dynamic skew to  $\pm 3$  microseconds maximum at 36 ips. Start time is 5 milliseconds to within  $\pm 10\%$  to rated speed; stop time is less than 1.5 milliseconds, with smooth velocity profiles. (See Figure 3)

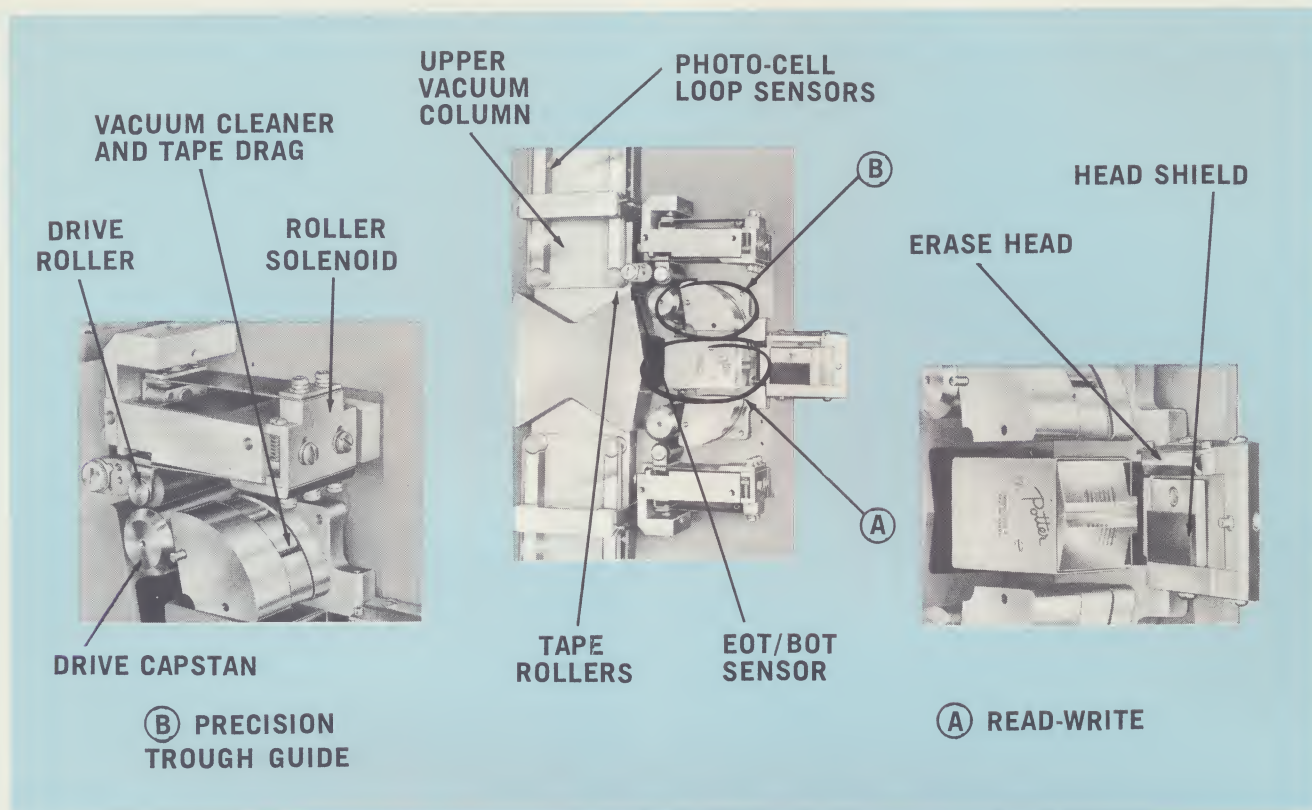


Figure 4. MT-36 Tape Drive System

### DRIVE ELECTRONICS & CONTROL

All MT-36 transport functions are controlled by a combined drive electronics and manual control assembly which is supplied with the transport. This compact package contains all control electronics, together with necessary power supplies for automatic or manual operation and checkout. Electronics are solid state, and feature

printed circuit, plug-in modules. The hinged front door gives immediate access to all components. Controls include a power on-off switch and three operating mode selector switches: "load-manual-automatic", "reverse-stop-forward", and "fast reverse-stop-fast forward."

For remote operation, the LOAD-MANUAL-AUTOMATIC switch is placed in the AUTOMATIC position; other controls in the STOP position.

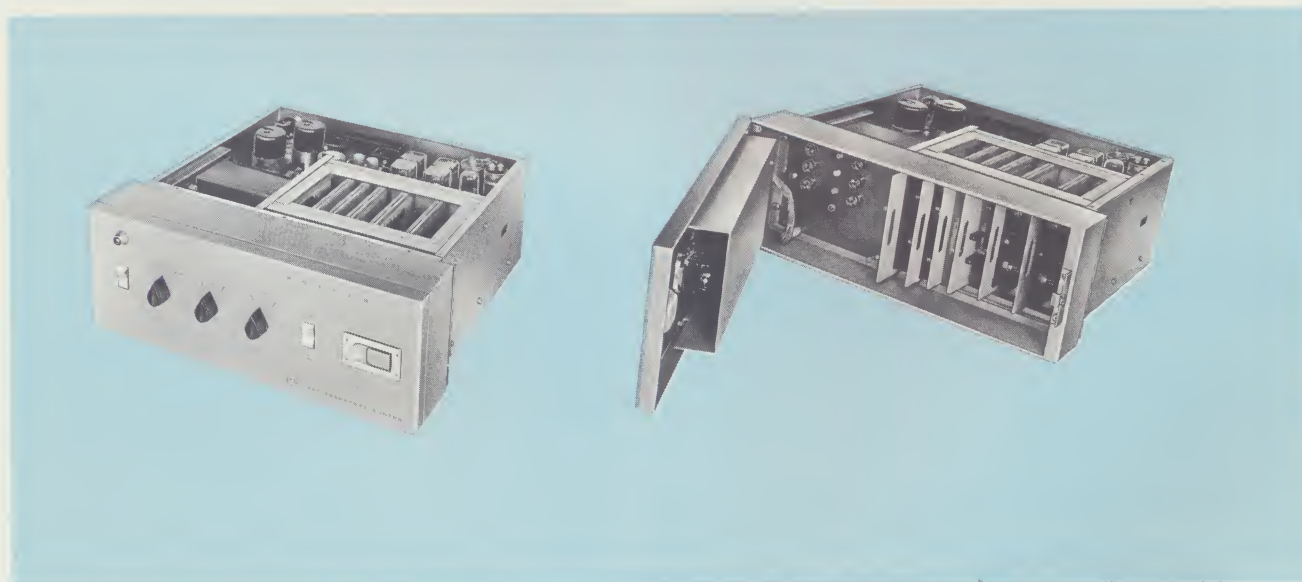


Figure 5. EC-36 Drive Electronics &amp; Control

## ACCESSORIES

### MT-36 TRANSPORT ACCESSORIES

• **READ-WRITE HEADS** — A complete selection of magnetic heads is available including heads for IBM seven channel format. Heads are all-metal, precision fabricated for maximum tape life and minimum interchannel time displacement.

• **REELS & HUBS** — IBM-type reels and hubs are standard equipment on MT-36 transports. Reel/hub combinations of other manufacturers can also be accommodated. Special Potter NAB reels and QUICK-LOCK\* hubs are available for one-inch tapes.

• **EOT/BOT SENSING** — Photoreflective (IBM-type) end-of-tape and beginning-of-tape sensing is available for reliable MT-36 tape control.

• **WRITE CONTROL** — A Write Lockup (Write Enable) switch is available for use with file protect rings on IBM or NARTB reels.

### MT-36 SYSTEM ACCESSORIES

• **READ-WRITE ELECTRONICS** — Standard amplifiers are available to accommodate packing densities up to 800 bpi and data transfer rates up to 40 kc.

Each read-write electronics assembly contains:

- up to eight read-write amplifier channels
- clock generator
- Write Inhibit electrical switching
- erase head control
- head compensation for read-write (as required)
- power supply

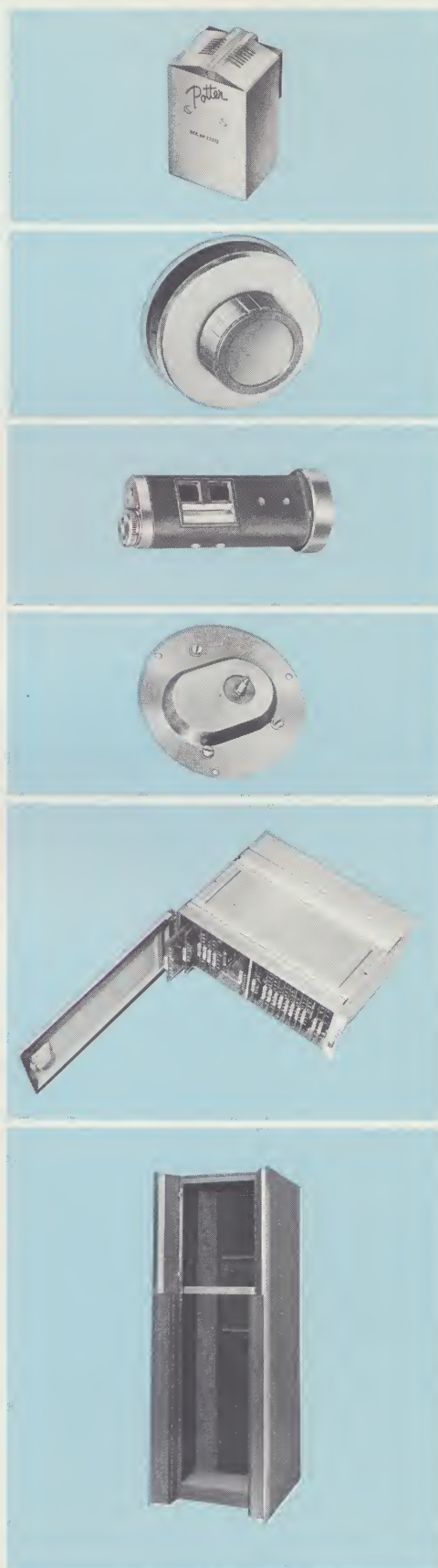
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- No. 1-403 MSA375 Read/Write Switching Amplifier

• **SWITCHING ELECTRONICS** — Switching amplifiers are available which reduce the cost of digital magnetic tape systems by permitting time-sharing of a single Read/Write amplifier package among groups of up to four tape units.

• **CABINET** — A special variation of Potter's standard M3340 rack cabinet accommodates the MT-36 transport and accessories listed above, providing for a complete, self-contained tape system. The sturdy construction of this cabinet permits full swing-out of the MT-36 transport. Standard 19-inch mounting rails provide solid mounting support for drive electronics and read-write amplifier electronics assemblies.

\*Patent applied for. QUICK-LOCK is a trademark of Potter Instrument Company, Inc.



## MT-36 SPECIFICATIONS

TAPE SPEEDS: Single speed . . . . .	30 & 36 ips standard; other speeds available up to 50 ips
Dual speed . . . . .	combinations in a ratio of 2:1, 3:1, 4:1 and 6:1 available
TAPE SPEED VARIATIONS . . . . .	$\pm 2\%$
TAPE REWIND . . . . .	approximately 2½ minutes for full 2400 foot reel
TYPICAL PERFORMANCE . . . . .	at 36 ips with ½-inch 1.5 mil Mylar tape:
START TIME . . . . .	5 ms from receipt of command to within $\pm 10\%$ of tape speed
START DISTANCE . . . . .	over cycling range of 0-200 commands/second tape travels 0.110" $\pm$ .020" 5 ms after receipt of command
STOP TIME . . . . .	less than 1.5 ms
STOP DISTANCE . . . . .	0.036" $\pm$ 0.015"
COMMAND REPETITION RATE . . . . .	Start/stop or forward/reverse 0-200 commands per second, 5 milliseconds between commands for performance within specifications.
WOW & FLUTTER . . . . .	less than 2% rms at 36 ips
INTERCHANNEL TIME DISPLACEMENT . . . . .	Static: 8 microseconds maximum
(at 36 ips), any two channels, ½" tape . . . . .	Dynamic: $\pm 3$ microseconds
	Total: 11 microseconds, maximum
TAPE WIDTHS . . . . .	½" or 1"
TAPE TYPE . . . . .	1 or 1½ mil Mylar
TAPE REELS . . . . .	IBM type 10½" reels and hubs standard for ½" tapes. Potter NARTB-type reels and special "Quick-lock" hubs standard for 1" tapes; other reel/hub combinations available
TAPE LOADING . . . . .	15 seconds-average tape loading time
REMOTE CONTROL INPUTS . . . . .	Run/Stop; Forward/Reverse; Normal Speed/Rewind Speed; Speed Control High/Low. All 0v/ - 5v @ 6 ma d.c. level
CONDITION INDICATION . . . . .	EOT/BOT Sensing Ready Forward Reply Reverse Reply Automatic—Manual Write Lockout (Type C contact) Power Supply
ELECTRONICS . . . . .	all control circuits completely transistorized; modular plug-in construction used throughout

## PHYSICAL DATA:

	Dimensions			
	High (in.)	Wide (in.)	Deep (in.)	Weight (lbs.)
MT-36 Tape Transport . . . . .	31½	19	11	90
EC-36 Drive Electronics & Control . . . . .	7	19	19	55
M3340 Cabinet . . . . .	76	27	35	415
POWER . . . . .	115 volts $\pm 10\%$ , 60 cycles, 600 watts, 875 watts, peak; 230 volts, 50 cycles, optional			
AMBIENT TEMPERATURE (Operating) . . . . .	32°F to 125°F			

**MT-36 INTERFACE CONNECTIONS**

Letters refer to contact pins, connector J/P-102, EC-36 Drive Electronics Chassis:

- A. -5v run/0v stop, at 5 ma
- B. -5v reverse/0v forward, at 5 ma
- C. Stop at EOT input (place jumper to pin D)
- D. EOT Output: Not on Foil, -15v. Maximum load to ground, 5 ma. On Foil, 0v.
- E. Ready Signal: -10v at 5 ma
- F. 10v nominal servo supply sample at 2 ma
- G. Rewind Command: -5v at 10 ma
- J. Stop at BOT input (place jumper to pin K)
- K. BOT Output: Not on Foil, -15v. Maximum load to ground, 5 ma. On Foil, 0v.
- L. Chassis GND
- M. Circuit GND
- N. Run Reverse Reply: -5v at 1 ma
- P. Run Forward Reply: -5v at 1 ma
- Q. Automatic Mode Reply: -7.5v at 2 ma
- T. Capstan Speed Change Command: -5v at 5 ma
- U. +15v sample (for interrogation only) at 5 ma
- V. -15v sample (for interrogation only) at 5 ma
- W. EOT Lamp Out Signal: Out, 0v, 24 ohms to ground; On, -5v to -10v @ 5 ma
- X. Write Lock-out Switch (normally closed contact)
- Y. Write Lock-out Switch (common contact)
- Z. Write Lock-out Switch (normally open contact)

**MT-24 AND MT-75 TAPE TRANSPORTS AND TAPE SYSTEMS**

The MT-36 is one member of a family of vacuum-buffered tape transports providing a range of speed capabilities as follows:

MT-24 Tape Transport . . . .	1 to 36 ips
MT-36 Tape Transport . . . .	1 to 50 ips
MT-75 Tape Transport . . . .	1 to 75 ips

All these units employ the same basic design configuration, and most parts are interchangeable between models.

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The Potter field service and logistics program is one of the finest in the EDP equipment industry. With reliable, quality-engineered equipment, supported by comprehensive field service, Potter guarantees satisfaction.

Information subject to change without notice.



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## MT-24 MAGNETIC TAPE TRANSPORT AND MAGNETIC TAPE SYSTEMS



### INTRODUCTION

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MT-24 Magnetic Tape Systems, which consist of an MT-24 Tape Transport, manual control unit, and suitable read/write electronics, are completely compatible with IBM systems such as the 729 and 7330. Packing densities of 200, 556 and 800 bpi can be accommodated. Other conventional tape formats utilizing  $\frac{1}{2}$ - or 1-inch tape are also available.

Read/Write speeds of 3, 7.5, 15 and 24 ips are standard with the MT-24, with fast two and one-half minute rewind. Start/Stop profiles are smooth and without program restriction free over a command frequency rate up to 200 per second. Other design innovations provide simplified tape loading, convenient transport adjustments, and easier maintenance.

### FEATURES

- highest performance and reliability for lowest price
- up to 28.8 kc data transfer (800 bpi)
- Compatible with IBM 729 and 7330 at all packing densities
- low interchannel time displacement
- fast, smooth Start/Stop performance
- new vacuum cleaning incorporated in trough guides
- new over-and-under vacuum storage system
- vacuum muffled for silent operation
- fast two and one-half minute rewind
- tape loading
- rapid, consistent tape stops with new vacuum tape drag



Figure 1. MT-24 Magnetic Tape System  
in CT-120 Cabinet

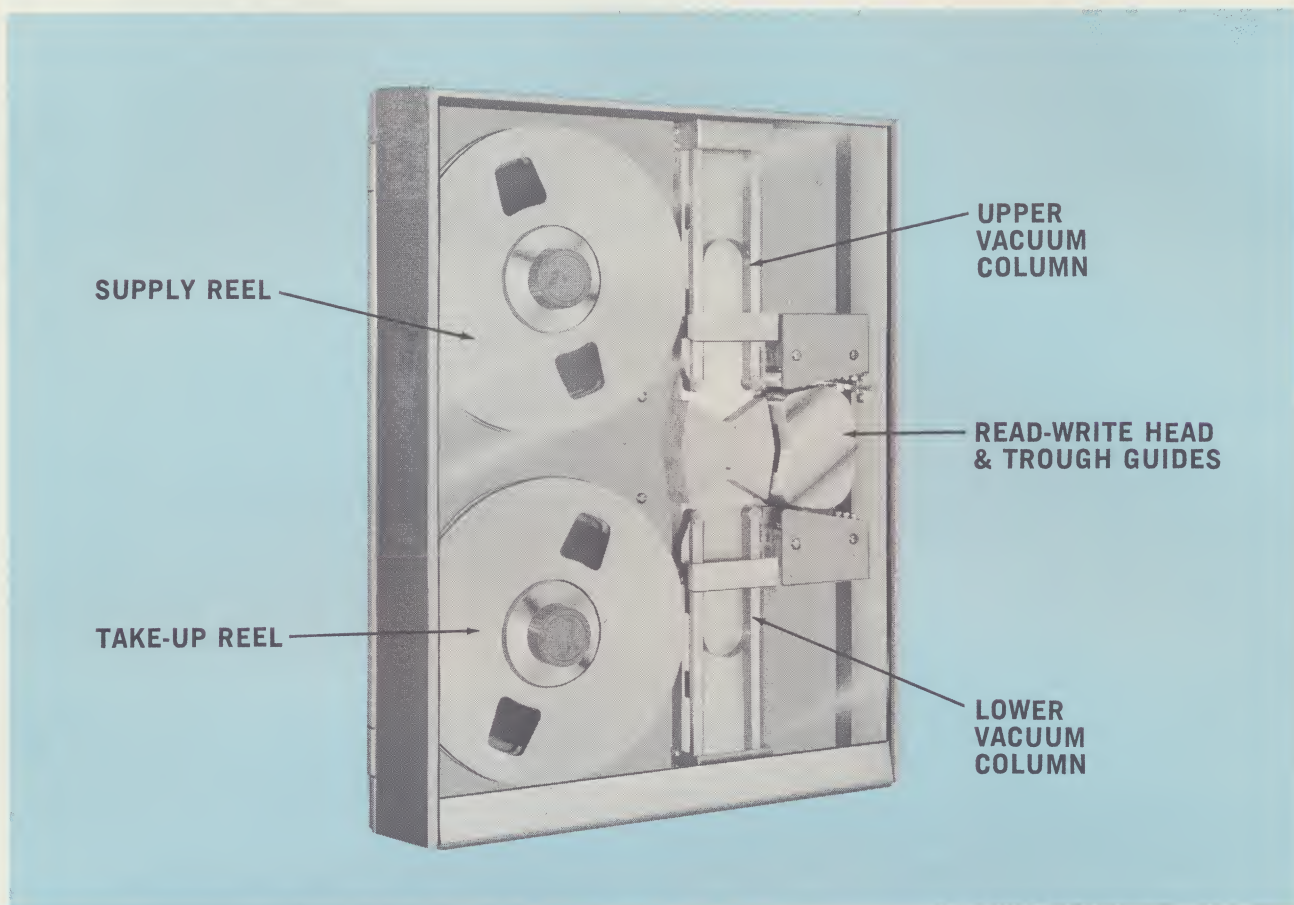


Figure 2. MT-24 Tape Drive

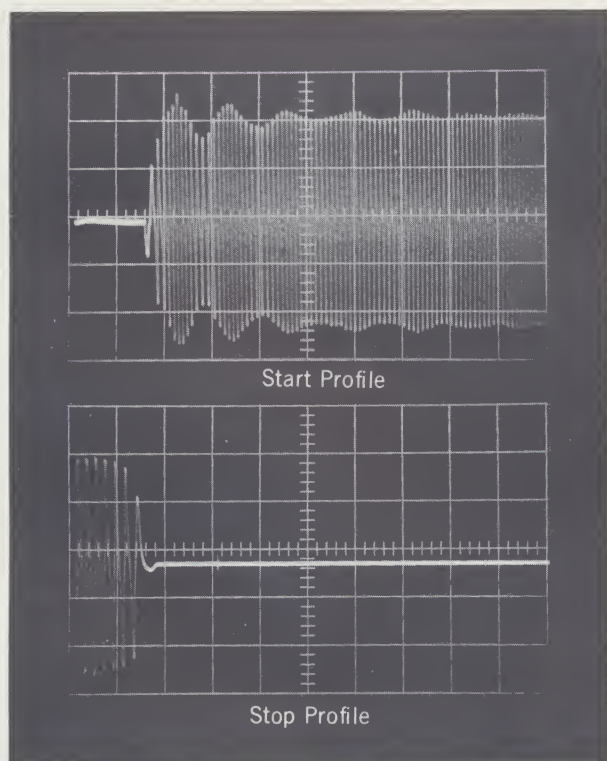


Figure 3. MT-24 Typical Velocity Profiles (1 div. = 1 ms)

### VACUUM COLUMN STORAGE

An extremely simple dual vacuum column tape storage system is incorporated in the MT-24 design—a feature normally associated with the most costly tape transport systems. Ample tape storage in the vacuum reservoirs provides restriction-free reading and writing up to 24 ips. Photoelectric loop sensing reliably controls the amount of tape in both vacuum columns. Transparent vacuum column covers are readily detachable for easy access to the column area during routine cleaning. The vacuum blower is soundproofed for exceptionally quiet operation.

### TAPE DRIVE SYSTEM

The MT-24 utilizes the Potter fast-response drive system which has become a standard of dependability in the EDP field. Tape motion is controlled by two drive capstans with associated solenoid-actuated drive rollers. New vacuum hold-down of tape in the trough guide area provides improved tape control. The slotted, vacuum trough guides which are precision-shaped for optimum tape guidance, hold dynamic skew to  $\pm 4$  microseconds, maximum, at 24 ips. Start time is 5 milliseconds to within 10% of rated speed; stop time is less than 1.5 milliseconds, with smooth velocity profile. (See Figure 3)

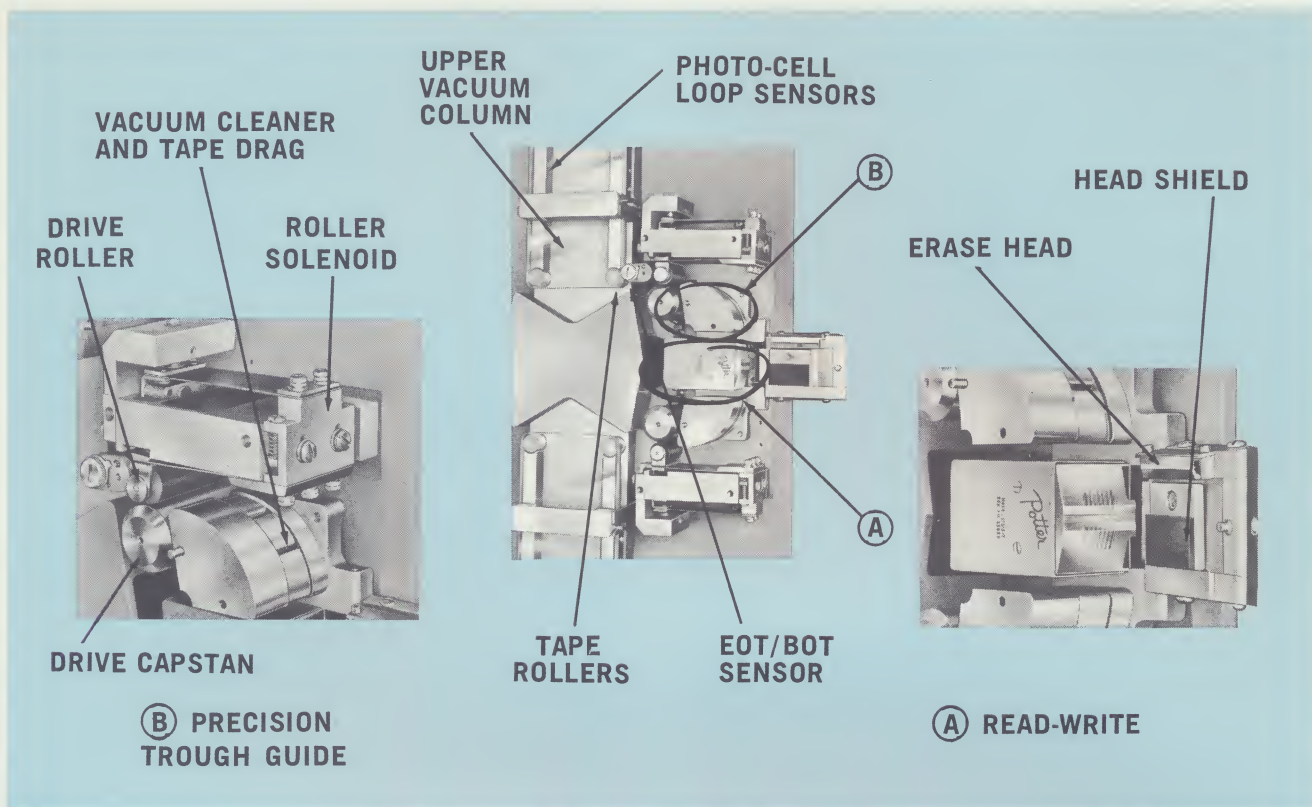


Figure 4. MT-24 Tape Drive Assembly

### DRIVE ELECTRONICS & CONTROL

All MT-24 transport functions are controlled by a combined drive electronics and manual control assembly supplied with the transport. This compact package contains all control electronics, together with necessary power supplies and blower for automatic or manual operation. Electronics are solid-state, and feature printed circuit, plug-in modules. Controls include a power ON/OFF switch and a LOAD POINT/UNLOAD switch, and three operating mode selector switches: LOAD-MAN-

UAL-AUTOMATIC, REVERSE-STOP-FORWARD, and FAST REVERSE-STOP FAST FORWARD. For remote operation, the LOAD-MANUAL-AUTOMATIC switch is placed in the AUTOMATIC position; other controls in the STOP position.

Control switches are placed vertically on the front of the CT-120 "slope front" cabinet to the right of the transport. When the M3340 rack cabinet is specified or when no cabinet is supplied, the controls are mounted on the front cover of the drive electronics package (figure 5).

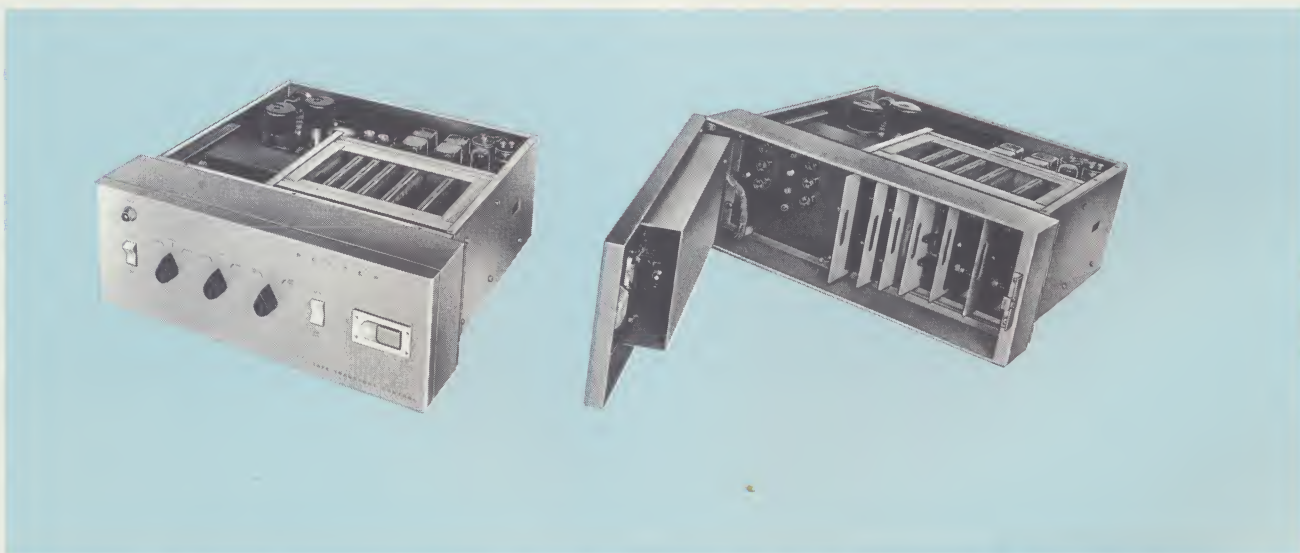


Figure 5. EC-36 Drive Electronics &amp; Control

## ACCESSORIES

### MT-24 TRANSPORT ACCESSORIES

• **READ/WRITE HEADS.** A complete selection of magnetic heads is available, including heads for IBM seven-channel format. Heads are all-metal, precision fabricated for maximum tape life and minimum interchannel time displacement.

• **REELS & HUBS.** IBM-type reels and hubs are standard equipment on MT-24 transports for  $\frac{1}{2}$ " tape. Reel/hub combinations of other manufacturers can also be accommodated. Potter NAB reels and QUICK-LOCK\* hubs are standard for one-inch tape.

• **EOT/BOT SENSING.** Photoreflective (IBM-type) end-of-tape and beginning-of-tape sensing is available for reliable MT-24 tape control.

• **WRITE CONTROL.** A Write Lockup (Write Enable) switch is available for use with file protect rings on IBM or NARTB reels.

### MT-24 SYSTEM ACCESSORIES

• **READ/WRITE ELECTRONICS.** Model 921A and MA315 amplifiers are available to accommodate packing densities up to 800 bpi and data transfer rates up to 28.8 kc.

Each read/write electronics assembly contains:

- up to eight Read/Write amplifier channels
- clock generator
- Write Inhibit electrical switching
- Erase head control
- head compensation for Read/Write (as required)
- power supply

For further information see the following Product Data Sheets:

- No. 1-401 M921A Read/Write Amplifier
- No. 1-402 MA315 Read/Write Amplifier
- No. 1-403 MSA375 Read/Write Switching Amplifier

• **SWITCHING ELECTRONICS.** Switching amplifiers are available which reduce the cost of digital magnetic tape systems by permitting time-sharing of a single Read/Write amplifier package among groups of up to four tape units.

• **CABINET.** Two standard Potter cabinets are available for housing the MT-24 transport or tape system. The new CT-120 cabinet features a "slope front" design for operator convenience. The MT-24 transport is mounted horizontally in the CT-120 cabinet, vertically in the M3340 rack cabinet. Both cabinets have a 300 cfm blower, air filter, power convenience strip and glass dust covers.

\*Patent applied for. QUICK-LOCK is a trademark of Potter Instrument Company, Inc.



**MT-24 SPECIFICATIONS**

TAPE SPEEDS (single)	3, 7.5, 15 and 24 ips standard; other speeds available: 1 to 36 ips
(dual)	Combinations in a ratio of 2:1, 3:1, 4:1 and 6:1 available
TAPE SPEED VARIATIONS	$\pm 2\%$
TAPE REWIND	approximately 2½ minutes for full 2400 foot reel
TYPICAL PERFORMANCE	at 24 ips, with ½-inch 1.5 mil Mylar tape:
START TIME	5 ms from receipt of command to within $\pm 10\%$ of tape speed
START DISTANCE	over cycling range of 0-200 commands/second tape travels 0.075" $\pm$ .020" within 5 ms after receipt of command
STOP TIME	less than 1.5 mil sec.
STOP DISTANCE	0.025" $\pm$ 0.015"
COMMAND REPETITION RATE	Start/stop or forward/reverse 0-200 commands per second, 5 milliseconds between commands for performance within specifications.
WOW & FLUTTER	less than 2% rms at 24 ips
INTERCHANNEL TIME DISPLACEMENT	Static: 12 microseconds maximum
(at 24 ips, any two channels, ½" tape)	Dynamic: $\pm 4$ microseconds
	Total: 16 microseconds maximum
TAPE WIDTHS	½" or 1"
TAPE TYPE	1 or 1½ mil Mylar
TAPE REELS	IBM-type 10½" reels and hubs standard for ½" tapes. Potter NARTB-type reels and special "Quicklock" hubs standard for 1" tapes; other reel/hub combinations available
TAPE LOADING	15 seconds-average tape loading time
REMOTE CONTROL INPUTS	Run/Stop; Forward/Reverse; Normal Speed/Rewind Speed, Speed control: High/Low. All Ov/-5v at 6 ma, d.c. levels.
CONDITION INDICATION	EOT/BOT Sensing Ready Forward Reply Reverse Reply Automatic-Manual Write Lock-out (type C contact) Power Supply
ELECTRONICS	all control circuits completely transistorized; modular plug-in construction used throughout

**PHYSICAL DATA:**

	Dimensions			
	High (in.)	Wide (in.)	Deep (in.)	Weight (lbs.)
MT-24 Tape Transport	24½	19	11	85
EC-36 Drive Electronics & Control	7	19	19	55
CT-120 Slope-Front Cabinet	63	30½	28½	285
M3340 Rack Cabinet	76	27	35	415
POWER	115 volts $\pm 10\%$ , 60 cycles, 600 watts, 875 watts, peak; 230 volts, 50 cycles, optional			
AMBIENT TEMPERATURE (Operating)	32°F to 125°F			

**MT-24 INTERFACE CONNECTIONS**

Letters refer to contact pins, connector J/P-102, EC-36 Drive Electronics Chassis:

- A. -5v run/0v stop, at 5 ma
- B. -5v reverse 0v forward, at 5 ma
- C. Stop at EOT input (place jumper to pin D)
- D. EOT Output: Not on Foil, -15v. Maximum load to ground, 5 ma. On Foil, 0v.
- E. Ready Signal: -10v at 5 ma
- F. 10v nominal servo supply sample at 2 ma
- G. Rewind Command: -5v at 10 ma
- J. Stop at BOT input (place jumper to pin K)
- K. BOT Output: Not on Foil, -15v. Maximum load to ground, 5 ma. On Foil, 0v.
- L. Chassis GND
- M. Circuit GND
- N. Run Reverse Reply: -5v at 1 ma
- P. Run Forward Reply: -5v at 1 ma
- Q. Automatic Mode Reply: -7.5v at 2 ma
- T. Capstan Speed Change Command: -5v at 5 ma
- U. +15v sample (for interrogation only) at 5 ma
- V. -15v sample (for interrogation only) at 5 ma
- W. EOT Lamp Out Signal: Out, 0v, 24 ohms to ground; On, -5v to -10v @ 5 ma
- X. Write Lock-out Switch (normally closed contact)
- Y. Write Lock-out Switch (common contact)
- Z. Write Lock-out Switch (normally open contact)

**MT-36 AND MT-75 TAPE TRANSPORTS AND TAPE SYSTEMS**

The MT-24 is one member of a family of vacuum-buffered tape transports providing a range of speed capabilities as follows:

MT-24 Tape Transport . . . .	1 to 36 ips
MT-36 Tape Transport . . . .	1 to 50 ips
MT-75 Tape Transport . . . .	1 to 75 ips

All these units employ the same basic design configuration, and most parts are interchangeable between models.

**POTTER WORLDWIDE FIELD SERVICE AND LOGISTICS PROGRAMS**

Repair centers in strategic locations within the continental United States and abroad have been established to support the entire Potter product line.

Staffed by highly-trained field representatives, these repair centers are equipped to effect on-site installation of equipments and to perform quality repair, maintenance and overhaul.

Supplementing this capability, if a customer prefers to provide his own equipment support, Potter has established standard instruction courses to train customer personnel, either at Potter or in the field.

A Spare Parts Department, backed up by an extremely large inventory, and streamlined order processing, is available for customer convenience and economy. This inventory permits the customer to realize virtual elimination of downtime as well as savings on spare parts dollars by offering expeditious delivery for replaceable parts. Delivery is available in 24 hours to meet customer emergency requirements — within 72 hours for standard parts under normal conditions. Potter also offers provisioning and logistics capabilities to meet all existing military specifications.

The Potter field service and logistics program is one of the finest in the EDP equipment industry. With reliable, quality-engineered equipment, supported by comprehensive field service, Potter guarantees satisfaction.



**POTTER INSTRUMENT COMPANY, INC.**

151 SUNNYSIDE BOULEVARD, PLAINVIEW, LONG ISLAND, N. Y. (516) OV 1-3200

# MT-75 MAGNETIC TAPE TRANSPORT AND MAGNETIC TAPE SYSTEMS



## INTRODUCTION

The MT-75 Magnetic Tape Transport is the newest addition to the line of Potter vacuum-column, digital tape handlers. Potter offers a complete line of high-performance, vacuum-column magnetic tape transports featuring packing densities to 800 bpi.

The MT-75 is designed for use with small- and medium-scale computers, in mass storage, and for sequential access application where high-priced transports cannot be justified.

The MT-75 operates at a speed of 75 ips, with a two and one-half minute rewind; and data transfer rates to 60 kc (bcd). Start/Stop profiles are smooth and program restriction free over a command frequency rate up to 200 per second. In addition to IBM packing densities of 200, 556 and 800 bpi, other formats utilizing ½-inch and 1-inch tape can be accommodated.

## FEATURES

- Highest performance and reliability at lowest cost
- Up to 60 kc data transfer
- Compatible with IBM 729 series at all ½-inch IBM packing densities
- Fast, smooth Start/Stop performance
- Rapid consistent tape stops with new vacuum tape drag
- Over-and-under vacuum storage system
- New vacuum cleaning incorporated in trough guides
- Primary and secondary vacuum buffers
- Muffled vacuum blower for silent operation
- Low interchannel time displacement
- Tape loading in fifteen seconds
- Fast two and one-half minute rewind

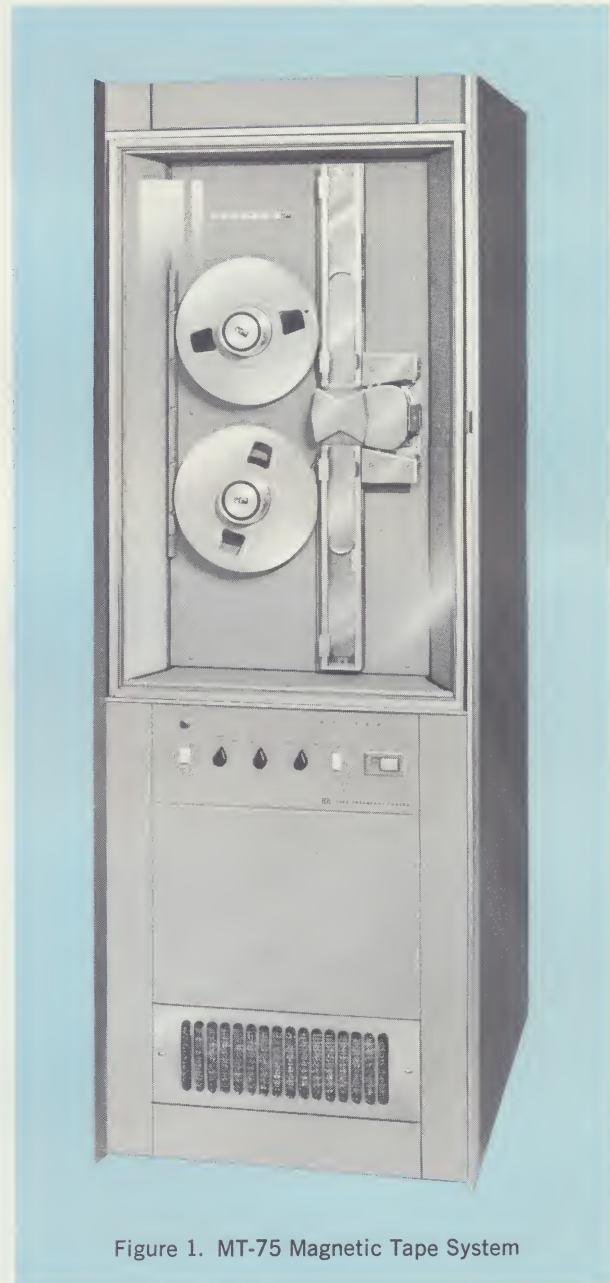


Figure 1. MT-75 Magnetic Tape System

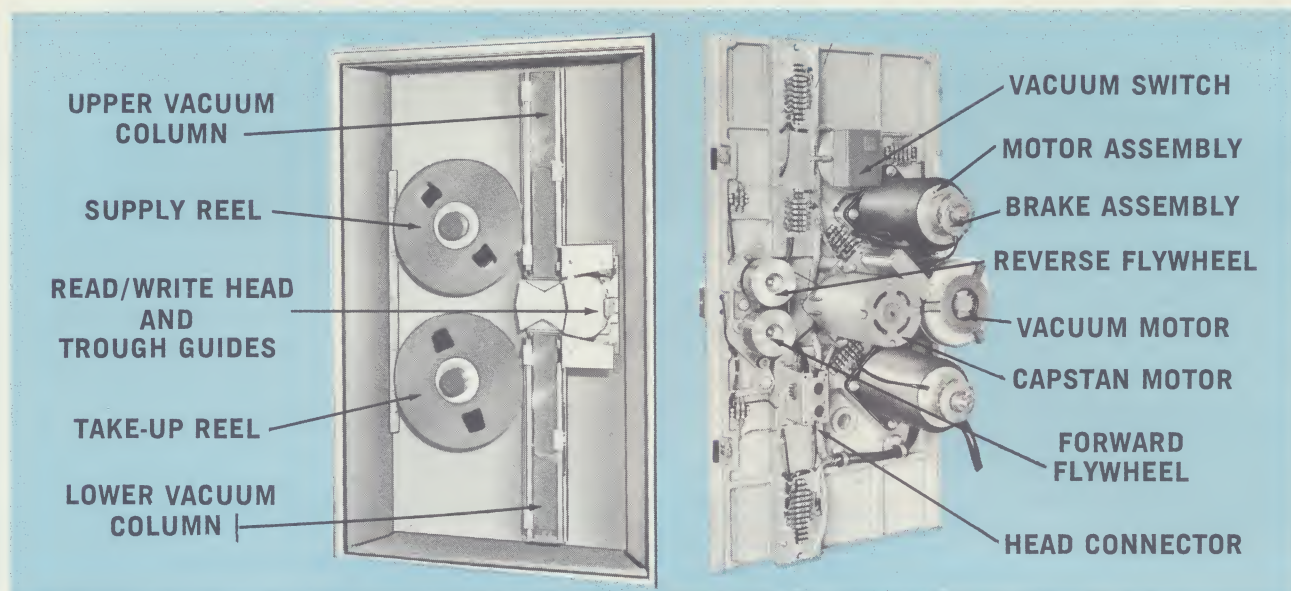


Figure 2. MT-75 Magnetic Tape Drive

### DESIGN FEATURES

The MT-75 Tape Transport incorporates several outstanding design features which simplify overall operation, improve reliability and reduce service costs. Tension arms have been replaced by a dual under-and-over vacuum-column tape storage system, used in combination with Potter's precision tape drive system. Ample storage in the vacuum reservoirs provide restriction-free reading and writing. Vacuum tape cleaning and vacuum tape drag before the Read/Write head assure high operating reliability.

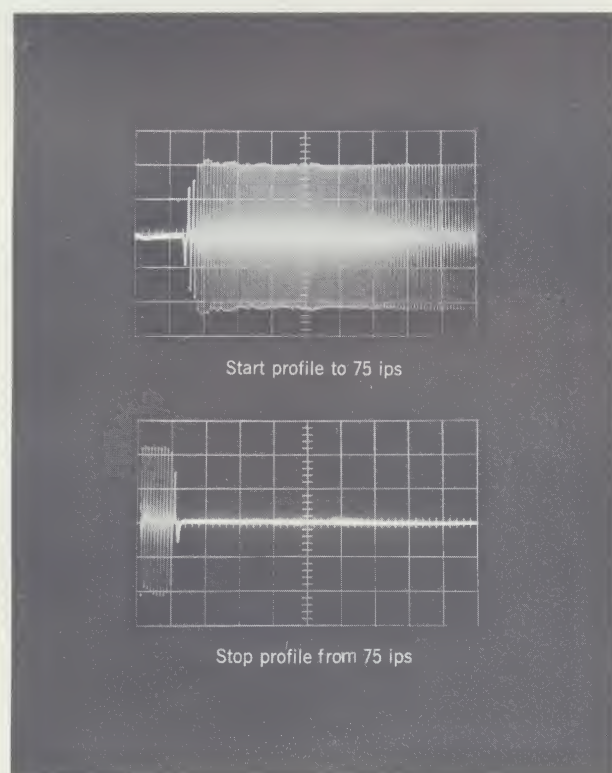


Figure 3. Typical Velocity Profiles (1 div. = 1 ms)

Secondary buffers integrally designed into the vacuum columns provide extremely fast velocity stabilization. Photoelectric loop sensing reliably controls the amount of tape in both vacuum columns. The vacuum column covers are hinged for easy access to the column area for routine cleaning.

New vacuum hold-down of tape in the trough guide area provides improved tape control. The convoluted vacuum trough guides, precision-shaped for optimum tape guidance, hold dynamic skew to  $\pm 1.5$  microseconds, maximum, at 75 ips. Start time is 3 milliseconds to within 10% of rated speed; stop time is less than 1.5 ms with smooth velocity profiles.

Integrated mechanical design throughout results in accessibility for easy maintenance. The main casting is designed to incorporate bearing mounts, vacuum columns and other components. This minimizes the number of component parts and provides simpler operation, maintenance and longer life.

The Erase Head is positioned to erase through the back of the tape, thus reducing tape wear.

Grouped control functions result in trouble-free switching.

The unit is self-checking. Safety interlock is provided for loss of vacuum, the power supply is cut off, the computer is signaled, and the tape transport stops.

### DRIVE ELECTRONICS & CONTROL PANEL (EC-75)

All MT-75 transport functions are controlled by a combined drive electronics and manual control assembly (EC-75) supplied with the transport. This compact package contains all electronics, together with necessary power supplies for automatic or manual operation. Electronics are solid-state and feature printed circuit plug-in modules. A hinged front door gives immediate access to plug-in modules.

For remote operation, the LOAD-MANUAL-AUTO-MATIC switch is placed in the AUTOMATIC position; other controls in the STOP position.

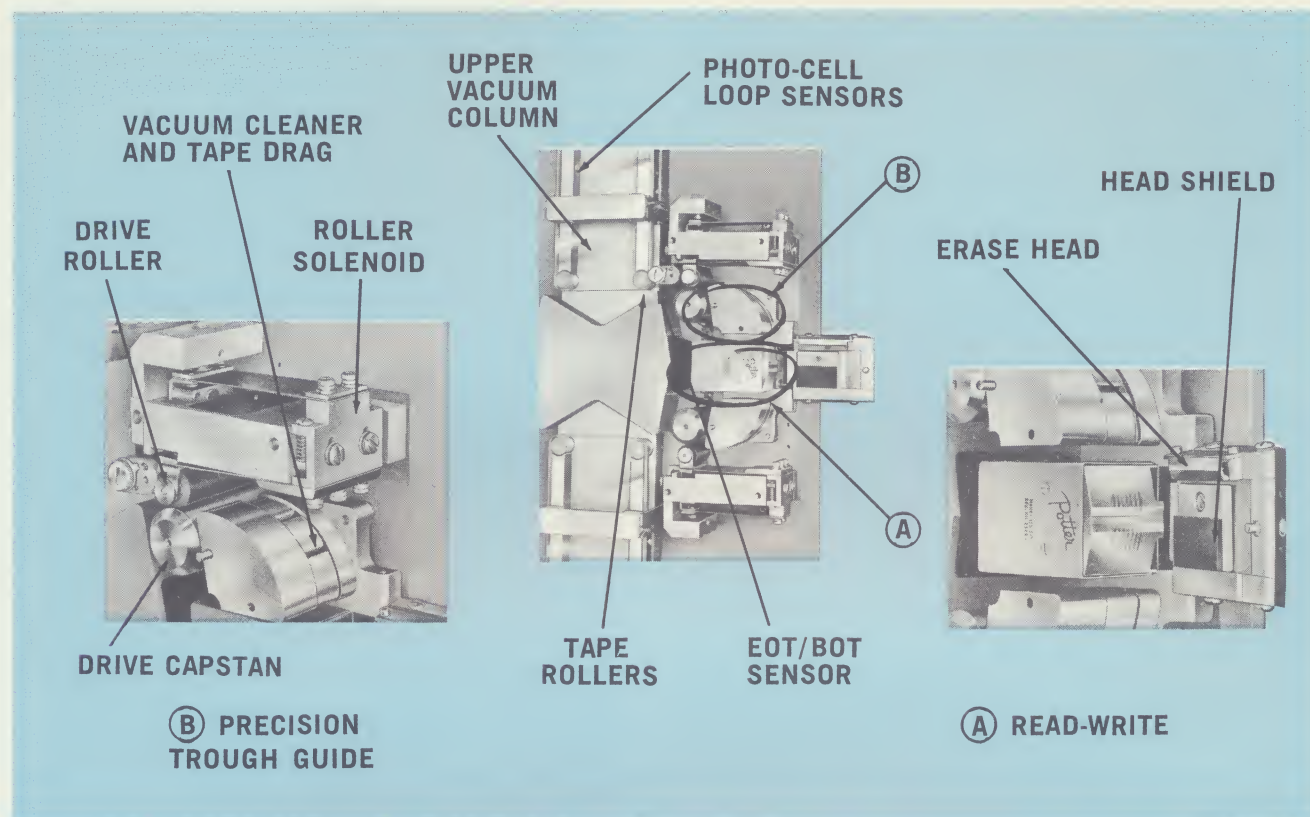


Figure 4. MT-75 Tape Drive Assembly

**OPERATING CONTROLS**

Three Rotary Position Switches

REVERSE/STOP/FORWARD;  
FAST REVERSE/STOP/FAST FORWARD  
LOAD/MANUAL/AUTOMATIC

One Push Switch .....ON/OFF

One Momentary Switch .....UNLOAD/LOAD POINT

New type interlock switches protect equipment from operator error by prohibiting rapid switching from FAST FORWARD to FAST REVERSE.

The Potter vacuum column tape handler incorporates the simplest technique for loading and threading tape. Complete reel loading and tape threading can be accomplished in only fifteen seconds.

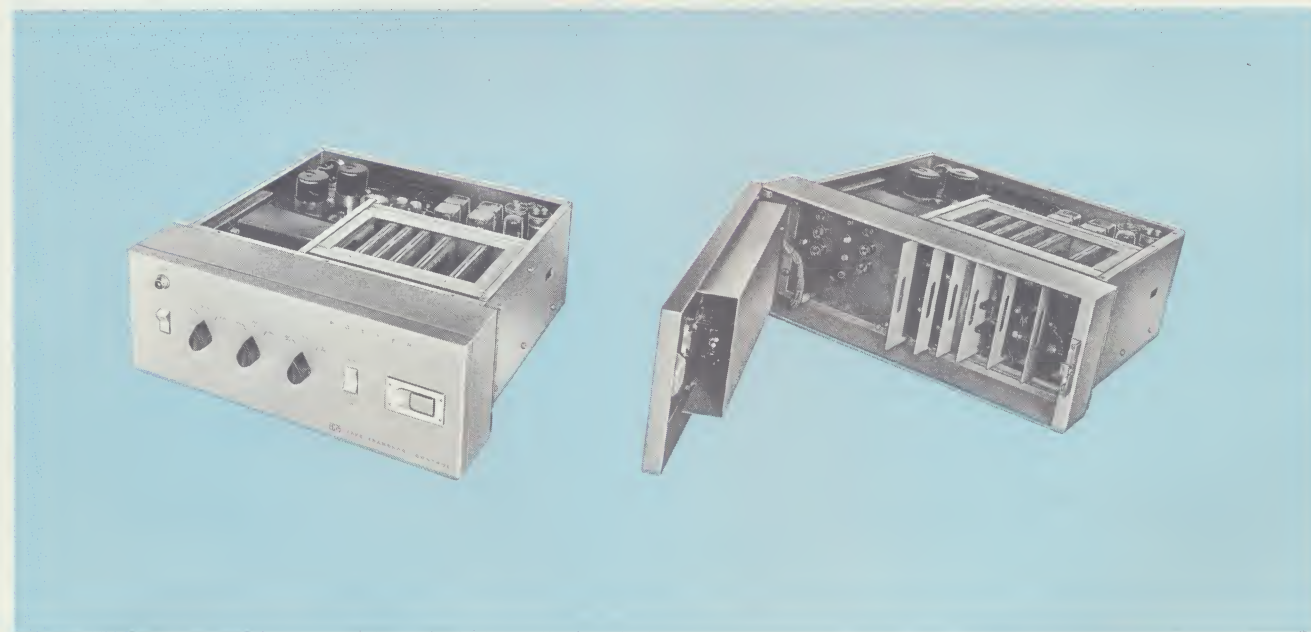


Figure 5. EC-75 Drive Electronics and Control

## ACCESSORIES

### MT-75 TRANSPORT ACCESSORIES

#### READ-WRITE HEADS

A complete selection of Potter magnetic heads is available for IBM 7-channel and other formats. Heads are all-metal and precision-machined to stringent specifications for maximum tape life and minimum interchannel time displacement.

#### REELS AND HUBS

IBM-type reels and hubs are standard equipment on MT-75 transports. Reel/hub combinations of other manufacturers can also be accommodated. Special Potter NAB reels and QUICK-LOCK® hubs are available for one-inch tapes.

#### EOT/BOT SENSING

Photoreflective (IBM-type) end-of-tape and beginning-of-tape sensing is available for reliable MT-75 tape control.

#### WRITE CONTROL

A Write Lock-out (write enable) switch is available for use with file protect rings on IBM or NARTB reels.

### MT-75 SYSTEM ACCESSORIES

#### READ-WRITE ELECTRONICS

Standard amplifiers are available to accommodate packing densities up to 800 bpi and data rates transfer up to 60 kc.

Each Read/Write electronics assembly contains:

- up to 8 Read/Write amplifier channels
- Clock Generator
- Write Inhibit electrical switching
- Erase Head control (as required)
- Head Compensation for Read/Write (as required)
- Power Supply

For further information see the following Product Data Sheets:

- No. 1-401 M921A Read/Write Amplifier
- No. 1-402 MA315 Read/Write Amplifier
- No. 1-403 MSA375 Read/Write Switching Amplifier

#### SWITCHING ELECTRONICS

Switching amplifiers are available which reduce the cost of digital magnetic tape systems by permitting time-sharing of a single Read/Write amplifier package among groups of up to four tape units.

#### CABINET

A special variation of Potter's standard M3340 rack cabinet accommodates the MT-75 Tape Transport and accessories, providing for a complete, self-contained tape system. The sturdy construction of this cabinet permits full swing-out of the MT-75 transport. Standard 19-inch mounting rails give solid mounting support for drive electronics and Read/Write amplifier electronics assemblies.

\*Patent applied for. QUICK-LOCK is a trademark of Potter Instrument Company, Inc.



**MT-75 SPECIFICATIONS**

TAPE SPEEDS . . . . .	60 and 75 ips standard; other speeds available to 75 ips																									
TAPE SPEED VARIATIONS . . . . .	±2%																									
TAPE REWIND . . . . .	approximately two and one-half minutes for full 2400 foot reel																									
TYPICAL PERFORMANCE . . . . .	at 75 ips with ½-inch, 1.5 mil Mylar tape:																									
START TIME . . . . .	3 ms from receipt of command to within ±10% of tape speed																									
START DISTANCE . . . . .	over cycling range of 0 to 200 commands per second tape travels 0.100" ±0.035" 3 ms after receipt of command																									
STOP TIME . . . . .	1.5 ms to cease all tape motion																									
STOP DISTANCE . . . . .	0.080" ± 0.020"																									
COMMAND REPETITION RATE . . . . .	Start/Stop; 0-200 commands per second, 5 milliseconds between commands for performance within specification. Forward/Reverse, short run, >5 <150 milliseconds, no stop required between change of direction. Long run, >150 milliseconds, 100 milliseconds stop required before starting in opposite direction.																									
WOW & FLUTTER . . . . .	less than 1% rms at 75 ips																									
INTERCHANNEL TIME DISPLACEMENT (at 75 ips , any two channels, ½" tape)	Static: 4 microseconds maximum Dynamic: ±1.5 microseconds Total: 5.5 microseconds maximum																									
TAPE WIDTHS . . . . .	½ or 1-inch																									
TAPE TYPE . . . . .	1 and 1½ mil Mylar																									
TAPE REELS & HUBS . . . . .	IBM-type 10½" reels and hubs standard for ½-inch tape. Potter special "Quick-lock" hubs standard for 1-inch NARTB. Other reel/hub combinations available.																									
TAPE LOADING . . . . .	complete tape loading and threading is less than 15 seconds																									
REMOTE CONTROL INPUTS . . . . .	Run/Stop; Forward/Reverse; Normal Speed/Rewind Speed, Speed control: High/Low. All Ov/-5v at 6 ma, d.c. levels.																									
CONDITION INDICATION . . . . .	EOT/BOT Sensing Ready Forward Reply Reverse Reply Automatic-Manual Write Lock-out (Type C contact) Power Supply																									
ELECTRONICS . . . . .	All control circuits completely transistorized; modular plug-in construction used throughout																									
HEAD SPECIFICATIONS . . . . .	For IBM compatibility, specify Model 17513-7 head. Heads for other formats available																									
PHYSICAL DATA:																										
	<table><tr><td></td><td colspan="3">Dimensions (inch)</td><td>Weight</td></tr><tr><td></td><td>High</td><td>Wide</td><td>Deep</td><td>(lbs.)</td></tr><tr><td>MT-75 Tape Transport . . . . .</td><td>36½</td><td>19</td><td>12</td><td>120</td></tr><tr><td>EC-75 Drive Electronics &amp; Control . . . . .</td><td>7</td><td>19</td><td>19</td><td>55</td></tr><tr><td>M3340 Cabinet . . . . .</td><td>76</td><td>27</td><td>35</td><td>415</td></tr></table>		Dimensions (inch)			Weight		High	Wide	Deep	(lbs.)	MT-75 Tape Transport . . . . .	36½	19	12	120	EC-75 Drive Electronics & Control . . . . .	7	19	19	55	M3340 Cabinet . . . . .	76	27	35	415
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POWER . . . . .	115v ±10%, 60 cycles, 600 watts, 900 watts peak; 230 v, 50 cycles optional																									
AMBIENT TEMPERATURE (Operating) . . . . .	32°F. to 125°F.																									

**MT-75 INTERFACE CONNECTIONS**

Letters refer to contact pins, connector J/P-102, EC-75 Drive Electronics Chassis:

- A. -5v run/0v stop, at 5 ma
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- X. Write Lock-out Switch (normally closed contact)
- Y. Write Lock-out Switch (common contact)
- Z. Write Lock-out Switch (normally open contact)

**MT-24 AND MT-36 TAPE TRANSPORTS AND TAPE SYSTEMS**

The MT-75 is one member of a family of vacuum-buffered tape transports providing a range of speed capabilities as follows:

MT-24 Tape Transport . . . .	1 to 36 ips
MT-36 Tape Transport . . . .	1 to 50 ips
MT-75 Tape Transport . . . .	1 to 75 ips

All these units employ the same basic design configuration, and most parts are interchangeable between models.

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Information subject to change without notice.



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